

Vegetative Propagation in *Asplenium exiguum*

JOHN T. MICKEL*,¹

Asplenium is one of the largest, most diverse, and widespread genera of modern ferns. Many of its nearly 800 species reproduce vegetatively by buds. In different species or species groups, buds have been reported on the roots (*A. auritum*, *A. cuspidatum*), in the axils of basal pinnae (*A. monanthes* var.), in the axils of several pinnae (*A. commutatum*), on the rachis near the apex (*A. sessilifolium*, *A. polyphyllum*), on an attenuated rachis tip (*A. radicans*, *A. rutaceum*, *A. rhizophyllum*), and plantlets have been observed on the upper surface of the pinnae (*A. bulbiferum*, *A. viviparum*), and on stolonoid fronds (*A. mannii*, *A. bipinnatifidum* complex). See Faden (1973) for a more detailed treatment of buds and plantlets in *Asplenium*. The various means of vegetative reproduction in *A. exiguum* are reported here and its horticultural possibilities are discussed.

Asplenium exiguum is a small spleenwort (fronds 3-20 cm tall) with an interesting disjunct geographic distribution. It is found in the Himalaya Mountains, the Philippine Islands, Mexico, and the southwestern United States. In 1971 the author discovered it in the Mexican state of Oaxaca near the village of Ixtlán de Juárez, growing on dry, exposed rocky cliffs and shaded ravines. Plants growing on the more exposed sites occasionally rooted at the tip of an extended rachis. This mode of reproduction has been noted by Bir and Shukla (1968), Copeland (1960, p. 442) and Knobloch and Correll (1962, p. 151).

Living plants transplanted to the New York Botanical Garden greenhouses have survived well. One plant was placed in our cloud forest chamber (the type described by Farrar, 1968), where it had nearly 100% humidity. After a few months, three methods of vegetative reproduction expressed themselves. A few fronds had prolonged apices with rooting tips (*Fig. 1e*); occasionally a frond forked at the tip (*Fig. 1c*), resulting in two proliferous apices. Some fronds developed buds at the base of pinnae near the tip of the rachis (*Fig. 1e*); this type has not been noted for this species previously. The most unusual development, however, was that a plantlet developed at the apex of many pinnae, forming a necklace of young plants around the entire frond (*Figs. 1b, d*). This is most pronounced on the older fronds as they lie close to the ground. Careful examination shows that all pinnae, whether they are on living plants in the cloud forest chamber or the greenhouse or are on herbarium specimens, bear a bud in the notch at the apex (*Fig. 1a*). Apparently wild plants only rarely get sufficient humidity to allow the buds to produce plantlets, for only rarely on herbarium specimens was it possible to detect with magnification the slightest germination of these buds, and plantlets were never seen.

These pinna proliferations have been noted only once before (Bir & Shukla, 1968), but their illustration (their fig. 27) shows the bud arising on the lower

*The New York Botanical Garden, Bronx, New York 10458.

¹This work was supported by grant BMS 75-08358 from the National Science Foundation. I am grateful to Mr. Edgar Paulton for preparing the drawings.

surface of the lamina. This is incorrect; in all specimens buds arise in the terminal notch of the pinna.

I know of no other species of *Asplenium* or of other ferns that bear buds at the pinna apices. With sufficiently high humidity, apparently this is a very efficient means of propagation in this species. It is curious, though, that the species is found in habitats that do not permit development of these buds. The fact that it produces buds in three different positions is equally remarkable.

Many species of *Asplenium* have been used in cultivation, and *Asplenium exiguum* may well be added to the list. It seems to be ideally suited for horticultural use in terraria or bottle gardens. It can withstand the very high humidity, it grows rapidly, it remains relatively small, it is an attractive plant in its natural habitat, and it is even more striking with the small plantlets along the frond outline. It is propagated readily by placing the plantlets in soil or on wet peat, and can also be grown well from spores. Hopefully, the number of these plants in cultivation will be increased so this species can be more widely distributed.

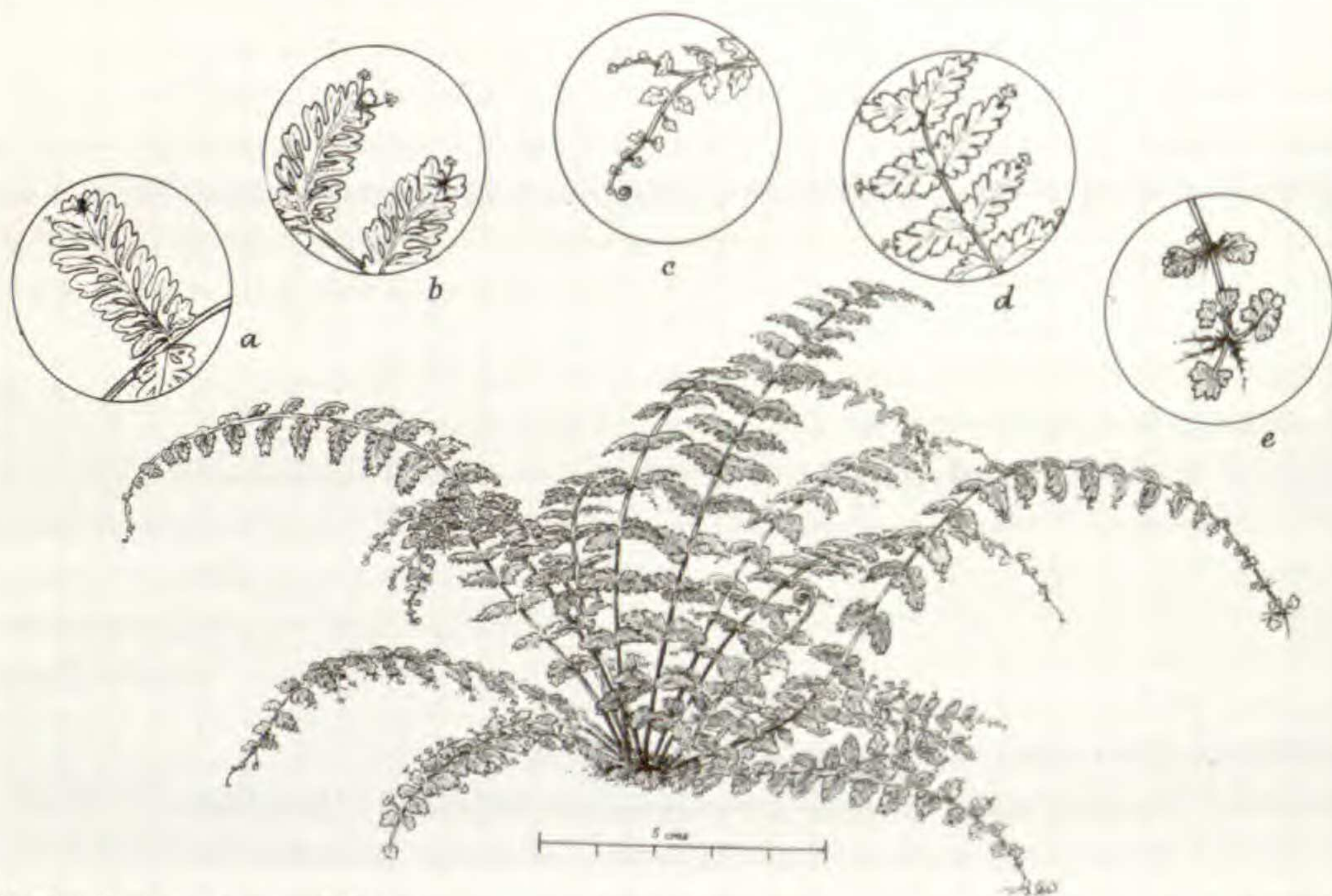


FIG. 1. *Asplenium exiguum*. FIG. 1a. Dorsal surface of pinnae with terminal buds. FIG. 1b. Dorsal surface of pinnae with plantlets. FIG. 1c. Forking frond tip. FIG. 1d. Ventral surface of pinnae with plantlets. FIG. 1e. Frond apex with terminal plantlet and rachis bud.

LITERATURE CITED

- BIR, S. S., and P. SHUKLA. 1968. Pteridophytic flora of Simla Hills (North Western Himalayas)-II. *Nova Hedwigia* **16**: 469-482, t. 179-182.
- COPELAND, E. B. 1960. Fern Flora of the Philippines. Monogr. Nat. Inst. Sci. Tech., Manila. **6**: 377-557.
- FADEN, R. B. 1973. Some notes on the gemmiferous species of *Asplenium* in Tropical East Africa. *Amer. Fern J.* **63**: 85-90.
- FARRAR, D. R. 1968. A cultural chamber for tropical rain forest plants. *Amer. Fern J.* **58**: 97-102.
- KNOBLOCH, I. W., and D. S. CORRELL. 1962. Ferns and Fern Allies of Chihuahua, Mexico. Texas Research Foundation, Renner, Texas.